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SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER
ZHU, RICHARD Z

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2625	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No.	Applicant(s)	
	10/785,481	NAKAJIMA, HISANORI	
	Examiner	**Art Unit**	
	RICHARD Z. ZHU	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _19 September 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1,4,5,8,9 and 12_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1, 4-5, 8-9, and 12_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Acknowledgement

1. Acknowledgement is made of applicant's amendment made on 09/19/2008. Applicant's submission filed has been entered and made of record.

Status of the Claims

2. Claims 1, 4-5, 8-9, and 12 are pending. Claims 2-3, 6-7, and 10-11 are cancelled.

Response to Applicant's Arguments

3. The applicant's arguments can be summarized around the main point that the processors as claimed process RGB color image data stored in the claimed memory whereas the data stored in swath memory 41 of ***Towery*** are not RGB color image data. The examiner agrees because ***Towery*** teaches storing CMYK data **(Col 3, Rows 63-67)**. In response to the comments made with respect to Col 4, Row 65 – Col 5, Row 3, it is well understood in the art of digital printing employing rasterized data that raw image data is either converted to be represented in RGB or CMYK color space. In the example of image data represented in CMYK color space, the color information of the image is divided into binary cyan plane, binary magenta plane, binary yellow plane, and binary black or key plane where each plane contains dot turn on information **("0" for non-printing dots and "1" for printing dots, if the data is halftoned. Up to 8 bits can be used to multi-gradation printing)** for each pixel position in the image. Full color reproduction is generated when four planes are overlay on top of one another to generate other colors for pixel positions having more than one of cyan, magenta,

yellow, and black dot turned on. Therefore, the teachings of ***Towery*** as cited by the applicant discloses storing dot state information corresponding to each of the CMYK color planes in the memory as taught. See ***Shibazaki (US 5546197 A)*** for more background teachings.

In response to applicant's argument that ***Towery*** fails to disclose a halftone process that uses a threshold pattern having a printing resolution on the converted RGB color data and that ***Towery*** does not indicate dithering is performed on the data stored in the swath memory 41. The examiner partially agrees.

While it can argued that ***Towery*** does not disclose Halftoning RGB color data, however, the relevant citations made by the applicant does not appear to suggest that dither would not be performed on the data stored in swath memory 41. In contrast, the citation made by the examiner establishes evidences that dither is inherently the halftone process of ***Towery*** because the section following Col 5, Rows 55-65 discuss ways for compensating dot overlaps as result of dither Halftoning (**Col 5, Row 65 – Col 6, Row 15, at the very least**). After all, what would be the point of its compensation method for dither dot overlap if dither Halftoning is not applied to the invention? Furthermore, it is conventionally understood in the art that dither screens are not made in a size so as to halftone the entire image bit map all at once (**This would be prohibitively expensive because it would require a huge buffer memory**). Instead, the entire bitmap is chopped into pieces of smaller bitmaps ranging from 3 by 3 pixels to exemplary 5 by 5 pixels and said smaller bitmaps are stored into buffer memory such as swath memory 41 so that a halftone screen of similar size can be applied onto said smaller bitmap to perform Halftoning (**See *Shibazaki*, Col 13, Row 10 – Col 14, Row 15, background teaching of how dithering is conventionally performed**). Since

Towery teaches that dither Halftoning is applied without getting into details, it is assumed that a conventional dither Halftoning process as described by ***Shibazaki*** is used. Therefore, ***Towery*** inherently teaches applying dither screens of CMYK onto bit map images contained in swath memory 41.

However, the examiner agrees that relevant image processing is not performed on RGB image data. Instead, the image data are expressed in CMYK space. Conventionally, image data are generated by scanners initially in RGB color space and then converted into CMYK color space **(US 6847377 B1, Col 8, Rows 35-50)**. This means a source image of ***Towery*** expressed in RGB color space is pre-converted into CMYK color space. As such, the examiner vacates the previous ground of rejection in favor of a new ground of rejection.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 4-5, 8-9, and 12 are rejected under 35 USC 103 (a) as being unpatentable over ***Towery et al. (US 5574832 A)*** in view of ***Nishida (US 6909522 B1)*** and ***Narumiya (US 5973803 A)***.

Regarding the apparatus of Claim 5 and therefore method of Claim 1, ***Towery*** discloses a print control device for creating dot data representing recording states of ink dots in order to perform color printing **(Fig 4, Print Controller 31 and see Col 4, Rows 34-48)**,

with a scanner print system utilizing main scanning and sub-scanning (**Fig 3 and see Col 3, Rows 25-35, Media Scan Axis and Carriage Scan Axis respectively**), by ejecting ink from nozzles of a print head during main scanning to thereby record ink dots on a printing medium (**Col 3, Rows 63-67 and see Col 4, Rows 34-48, driving printhead to print cyan, magenta, yellow, and black**), the print head having a plurality of nozzle groups (**Col 3, Rows 38-44, printhead cartridges C1, C2, C3, and C4 having downwardly facing nozzles onto a print media**) that ejects plural types of inks (**Col 3, Rows 63-67, each of C1, C2, C3, C4 being responsible for ejecting C, M, Y, and K ink**), respectively, each of the plurality of nozzle groups including a plurality of nozzles whose nozzle pitch in a sub scanning direction is larger than a pitch of print pixels (**Fig 3 and see Col 4, Rows 1-16 and see Col 6, Rows 1-16. This printer has a nozzle pitch of 1/300 and it employs double dot method to print pixels at 600 dpi, or a pixel pitch of 1/600 whereas 1/300 > 1/600**), the print control device comprising:

the print control device comprising:

a first processor (**Fig 4, Microprocessor Controller 31**) for storing color image data for a partial area of an image to be printed corresponding to a height of entire nozzles of the printhead in the sub scanning direction (**Col 4, Rows 34-48, portion of the raster data is stored into swath memory 41 by the print controller where drive signals are directed to the driver motor to drive the printhead to print in the media scan axis or main scanning axis and to enable carriage to enable printing in the carriage scan axis or sub scanning axis**) that are used during each main scanning pass of color printing into a first buffer (**Col 4, Rows 18-28, storing print data received from a host computer into a first buffer**

memory 34 until said buffer memory is full), but not the entirety of the color image data for the image to be printed **(Col 4, Rows 18-28, conventionally, a buffer memory is not big enough to fully contain the entire print data. Therefore, a portion but not the entirety of the print data are transferred to said buffer memory until it is full and further transfer of remaining print data will not start until said portion but no the entirety of the print data is transfer to a second buffer, such as a swath memory 41 as describe later. See *Nishida,* Col 1, Rows 26-42)**;

a second processor **(Fig 4, Print Controller 31)** for selecting not the entirety but a part of the stored color image data **(Col 7, Rows 60-64)** that represent a color image part on a plurality of printing-subject lines subject to recording of ink dots performed by the plurality of nozzle groups during a single main scan from the first buffer **(Col 3, Rows 63-67 and Col 4, Rows 34-48)**;

a third processor **(Fig 4, Print Controller 31)** for performing a halftone process that uses a threshold pattern having a printing resolution on the color image data on the plurality of printing-subject lines to create dot data representing recording states of ink dots in print pixels on the selected printing-subject lines **(Col 5, Rows 43-64, dither halftoning)**, and storing the dot data into a second buffer **(Fig 4 and see Col 4, Rows 18-34, buffer memory 34 - > bit map memory 42a -> swath memory 41)**; and

a fourth processor for outputting the dot data from the second buffer **(Fig 4 and see Col 4, Rows 34-48, print controller 31)**, wherein the color image data has a resolution

Rdata which is lower than a printing resolution Rprint (**Col 12, Rows 16-34, resolution upscaling of raster image data at 300 dpi into output print data at 600 dpi**);

repeatedly selecting an identical pixel value of the color image data (Rprint / Rdata) times for use in the resolution upscaling process (**Col 12, Rows 18-34**).

Towery does not teach the third processor for performing a color conversion process on the selected color image data and not on the entirety of the color image data wherein the selecting includes repeatedly selecting an identical pixel value of the color image data (Rprint/Rdata) times for use in the halftone process.

Nishida teaches an apparatus for upscaling image data at a first lower resolution to a second higher resolution (**Figs 1-2 and Fig 5 and see Col 2, Rows 15-22**) having a processor (**Fig 1, Control Section 5**) for storing image data for a partial area of an image to be printed (**Col 3, Rows 41-50, data in raster format are divided into background plane having colors, foreground plane having text or characters, and a selector plane for making a final composite image output**) that selects a portion of but not the entirety of image data for halftone process that uses a threshold pattern having a printing resolution on the selected image data (**Col 4, Rows 26-55, selecting a portion of image data, and see Col 4, Row 56 – Col 5, Row 4, halftone processing by dither threshold matrix or pattern**) wherein the selecting includes repeatedly selecting an identical pixel value of the image data (Rprint / Rdata) times for use in the halftone process (**Figs 2 and 5, Col 6, Rows 1-24. Fig 2A shows original image data at a first lower resolution. Fig 2B shows print data at a second higher resolution that is twice the resolution of the first lower resolution by dividing the**

first address of Fig 2A into four divided unit surface area; i.e., division of a surface of a printing medium is repeatedly executed with an address given to a divided unit surface area or repeatedly selecting an identical address having identical pixel value of the image data for division for Rprint / Rdata times).

Nishida suggested that by upscaling images from a first resolution to a second resolution would result in substantial savings in memory (**Col 6, Rows 15-18**). Therefore, it would've been obvious to one of ordinary skill in the art to adopt the configuration of ***Nishida*** as suggested into the system of ***Towery*** to upscale the image from a first resolution to a second resolution by repeatedly selecting an identical pixel value of the image data (Rprint / Rdata) times for use in the halftone process whereas the motivation would've been to allow a substantial saving of memory (***Nishida*, Col 6, Rows 15-18**).

The teachings, as combined, yields a system that would upscale a color image from a first resolution to a second resolution (***Towery*, Col 3, Rows 63-67**).

However, the combined teachings do not teach that the image data are processed in RGB color space and a color conversion process within the third processor for converting a portion of said RGB image data into CMY image data but not the entirety of image data that is present within the buffer when the buffer is full and further transfer of remaining image data is stopped because the image data is already converted into CMY color space.

Narumiya discloses a processor for scanning a portion but not the entirety of a source image and represent said portion in RGB color space as RGB image data (**Col 2, Row 60 – Col 3, Row 8**), storing the portion of RGB image data into a buffer memory (**Col 3, Row 8-**

20, buffer memory 7), converting said portion of RGB image data into CMY image data but not the entirety of image data that is present within the buffer in a color conversion process **(Col 3, Rows 20-25, converting one line of RGB image data in the buffer into CMY)** and thereafter perform dither halftone processing on said portion of the color converted image data **(Col 3, Rows 25-35, halftoned the color converted image data using dither matrix)**.

It would've been obvious to one of ordinary skill in the art at the time of the invention to modify the processor of the combined teachings to perform relevant processing and storage steps with image data in RGB color space and thereafter color converts said data into CMY data and thereafter halftoned said color converted data in the manner as taught by ***Narumiya*** whereas the motivation would've been to provide a novel color image processor having a greatly simplified construction to save a significant amount of time when executing color image processing operations by performing reading and printing operations at the same time **(*Narumiya*, Col 1, Rows 37-47)**. Therefore it would've been obvious to modify the processor of the combined teachings to obtain the claimed processor.

Regarding the computer program product of Claim 9, *Towery* discloses a computer program product for implementing the steps of Claim 1 and device of Claim 5 comprising:

a computer readable medium **(Fig 4, Read Only Memory 44)**; and

a computer program **(Col 4, Rows 24-34, a read-only memory 44 is als0 provided as appropriate for the use of the microprocessor)** stored on the computer readable medium for causing the processor to implement the functions of Claim 1 and Claim 5.

Regarding Claims 4, 8, and 12, *Towery* discloses in cases in which print pixel positions on each printing-subject line subject to recording of ink dots during the single main scan include recording-subject pixel positions that are subject to recording of ink dots and non recording-subject pixel positions that are not subject to recording of ink dots during the single main scan, the third processor performs replacing values of dot data for the non recording-subject pixel positions among dot data on each printing-subject line with a value representing non-formation of do t (**Col 12, Rows 18-34, replacing non-printing dots in the upscale image with logic "0", which is non-printing**).

Conclusion

5. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Richard Z. Zhu whose telephone number is 571-270-1587 or examiner's supervisor King Y. Poon whose telephone number is 571-272-7440. Examiner Richard Zhu can normally be reached on Monday through Thursday, 0630 - 1700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RZ[2]
10/25/2008

Richard Z. Zhu
Assistant Examiner
Art Unit 2625

/Twyler L. Haskins/
Supervisory Patent Examiner, Art Unit 2625